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ABSTRACT

After its independence in 1969, Indonesia studied and analyzed its previous colonial system of technical and vocational education (TVE) and took steps to overcome the shortcomings. TVE was required to provide expansion of work opportunities and industrial development to promote national development. Until 1989, attention was given to further improve TVE and increase its quantity, although the main mission was still increasing student enrollment. As part of quality improvement, the curriculum was developed and improved, the number of teachers was increased, new buildings were constructed, and books and workshop equipment were purchased. "School integrated development" as a new strategy for quality improvement was introduced in 1989. Efforts were intended to increase the efficiency and effectiveness of the school institution. This approach demanded all activities of school elements be interrelated as a system. Students, curricula/programs, teachers, facilities, and graduates were improved, developed, and renovated simultaneously in a system in which they influenced each other. Each school was encouraged to establish production units and closely link with industry through partnerships. The most recent development of the close link between TVE schools with industry was implementation of the "dual system" in which parts of the curriculum were conducted in industry in a day- or block-release system. (Appendixes include a glossary, data tables, and organizational charts.) (YLB)

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CASE STUDIES ON TECHNICAL AND VOCATIONAL EDUCATION IN ASIA AND THE PACIFIC

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International Project on Technical and Vocational Education
Projet international pour l'enseignement technique et professionnel

CASE STUDIES ON TECHNICAL AND VOCATIONAL EDUCATION IN ASIA AND THE PACIFIC

The Development of Technical and Vocational Education in Indonesia — A Case Study in Quality Improvement

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KEY FACTS

Area	more than 1,849,731 sq km of land area
Population	about 180 million
Title of country	REPUBLIK INDONESIA

Climate and geography

Tropical climate, comprising to two seasons, the rainy season and the dry season. Indonesia is an archipelago with about 13,700 islands

Official language
Bahasa Indonesia

Ruling political party	Golongan Karya (Business/Working Class Party)
Head of government	President, Mr Suharto
Currency used	Rupiah
Political system	A democratic country based on Pancasila (The Five Basic Principles) as its philosophy and Udang-Udang Dasar 1945 (the 1945 constitution). The formation of the Cabinet is done an is headed by the President, and the President is responsible to the People's Advisory Assembly and the Legisla tive Assembly.

Social Welfare
The Government provides its retired officials and their widows pensions and health insurance. The Government is also responsible for welfare of orphans, old age people as well as invalids. The public welfare is not only the responsibility of the government, but the whole community of the people. In this case, beside private social organisation the Family Welfare Movement (PKK) organised by the wives of government officials and women's organisations, plays an important role in improving the welfare of a family as the smallest unit in a society.

Education
Mostly all children of 7 to 12 years old follow the primary education. The duration of compulsory education has been increased from 6 to 9 years. The formal school system is 6-3-3 pattern. This structure represents primary, lower secondary and upper secondary levels respectively. Education at the tertiary level is provided by universities, colleges and poly-technics. Out of school education is also conducted for those who do not follow the formal education

Economy
The economic growth ranges from about 6 to 7 per cent. Contribution of industrial sector to national production is 22.3 per cent, while from agricultural sector it is only 18.5 per cent.

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EXECUTIVE SUMMARY

Before 1969 the system of technical and vocational education in Indonesia was the continuation of the colonial system. After independence, the number of school and student enrolment was significantly increased, but unfortunately it was not followed by the provision of facilities especially equipment for workshop practice. The system was not orientated to the needs of skilled man power for the nation.

During the first five year development (1969-1974), the previous system was studied and analysed, then steps were taken to overcome the shortcomings. The technical vocational education was developed based on creating a balance between man power needs for supplying industrial expansion, educational aspiration of the community, and abilities needed for the development, covering skills, intelligence and a healthy attitude toward work.

Parallel to the national development strategies, the technical and vocational education was demanded to provide expansion of work opportunities and industrial development to suit the development. During this stage, up to 1989 the attention was given to further improve technical and vocational education as well as increase its quantity, although the main mission was still on the increasing number of student enrolment. For the quality improvement, the curriculum was developed and improved, the number of teachers was provided and was upgraded, the number of new buildings was constructed and renovated, besides books and workshop equipment was facilitated.

"School Integrated Development" or integrated development of school as a new strategy for quality improvement was introduced in 1989. The efforts were to increase the efficiency and the effectiveness of the school institution. Schools should be effective in the meaning of the optimum use of the available resources and efficient in the meaning of the high percentage of absorption of the school graduates by the world of work. The integrated development of school is the development based on school centred, focusing on the school, occurred at school and conducted by the school.

Basically the integrated development approach demands all activities of school elements to be interrelated as a system. The elements of school such as student, curriculum/program, teachers, facilities and graduates are improved, developed and renovated simultaneously in a system which influence each other. In addition to the integrated school development for improving the effectiveness and the efficiency, each individual school is also encouraged to establish production units and closely link with industry in the form of institutional partnership.

The latest development of the close link between technical and vocational schools with the industry is the implementation of "The Dual System", where parts of the curriculum of technical and vocational education is conducted in industry in the form of a day release or block release system. This part of training in industry is aimed to breed the professionalism of the student.

1. INTRODUCTION

Indonesia has a population of over 180 million people. The population is spread out over about 13,700 islands, which extend about 5,000 kilometres east to west and 2,000 kilometres north to south. Over 60 percent of the population lives in Java, which has a density of 800 people per square kilometre. The remaining population is spread out over the other islands especially in the big island of Sumatera.

The Indonesian Government policy has given emphasis on human resource development and supported a rapid expansion of the formal school system. Net primary education enrolment rates were an estimated 98 percent in 1988/1989 and about 100 percent at the end of 1993/1994, so that starting on the sixth five-year development plan (PELITA VI) or the starting of the second long term development plan (PJPT II, 1994/2019) Indonesia can increase the duration of compulsory education from six years to nine years.

The technical and vocational education in Indonesia is provided through junior technical and vocational schools (SMKTP) and senior technical and vocational schools (SMKTA) at secondary level and high school or universities for tertiary level. The junior technical and vocational school is planned to supply the semi-skilled worker, while the senior technical and vocational school will provide middle level manpower or tradesmen for the job market.

Diploma programs for higher technician manpower qualification are provided at Polytechnics, high school or university, while degree programs for technologists are produced by high schools or universities.

Technical and vocational education is expected to be primarily job-oriented. Like any other type of education, technical and vocational education must also endeavour to develop a creative mind together with the capacity to apply knowledge and know-how. But technical and vocational education has to primarily consider the demands of the employment market where the acquired knowledge can be profitably used.

Ideally, the number of graduates available for job and employment opportunities should be balanced. Thus, the problems in technical and vocational education are both in quantity and quality. By quantity is meant the balance between the present and the future availability of technical and vocational educated manpower for industrial demands and other relevant technical and vocational manpower purposes, and quality is that the knowledge as well as skill of the graduates satisfy the requirements of the job market and world of work.

The role of the middle level manpower in the developing country is very important especially when the country of Indonesia has chosen industrialisation as the main alternative for economical takeoff. This is a study of the development of technical and vocational education, and will be concentrating on the development of senior technical and vocational education conducted under the Directorate of Technical and Vocational Education (Dit Dikmenjur) of the Director General of Primary and Secondary Education (Ditjen Dikdasmen), whose main role is providing middle level manpower of the country.

Specifically this study investigates the answers to the following:

- How is senior technical and vocational education in Indonesia developing?
- How does the senior technical and vocational education respond to the requirement of quantity due to the increased number of children of school age and the increased requirement for supplying middle level skill manpower?
- What is the strategy for the establishment of effective schooling which can cope with the development of science and technology and the demand of community?
- What is the approach to efficiently utilise the resources for supporting the operation of senior technical and vocational schools?
- How to promote the close linkage between the school system and industry in responding to the requirement of providing qualified graduates, and the changing demands of manpower, industry and the world of work.

2. THE ECONOMIC CONDITIONS AND HUMAN RESOURCE DEVELOPMENT

Indonesia is entering the second long-term development in April 1994. The economic growth during the first long-term development (1969–1994) was encouraging. During the period of 1988 to 1992 the economic growth was about 6.7 percent, which was higher than the projected economic growth rate of the same period. The main reasons for the high growth is the increase of manufacture export which is supported by the growth of the construction sector, electric generator construction, transportation and telecommunication sectors. It is expected that the economic growth will have the same pattern in 1994 and 1995 and will not be less than the projected rate which is between 6–7 percent.

The economic growth in Indonesia is high, due to the support of oil in 1970. Oil exports contributed 84 percent to Gross Domestic Product, especially at the peak era of oil in 1982, while the contribution of the agricultural sector was only 13 percent and manufacture export was 3 percent. The decrease of export in 1983 up to 1986 has forced Indonesia to launch packages of deregulation, creating an economy based on the power of market. The result was the increase of non-oil export up to 24.3 percent annually, during 1986–1992, with the highest contribution of manufacture sector of about 35.1 percent in the same period. In 1992 the contribution of non-oil export was higher than the oil sector. More than 50 percent of the total Indonesian export was supported by non oil sector.
The first long-term development of Indonesia has successfully solved the problems of food and clothing. The emphasis of the national development was mainly on the benefit of natural resources such as agriculture, mining, petroleum etc. which will not last forever.

For the success of the second long-term development, concentration has to be focused on the development and the utilisation of human resources to produce maximum economic growth.
Indonesia has chosen industrialisation as the main alternative for economic takeoff. Its consequences is a transformation process of industrial culture orientation. To face the economic takeoff through industrialisation, the national education system should give more emphasis on science and technology.
Indonesia's major challenge is to create jobs. Increased skill level in all sectors is required to position Indonesia for industrial takeoff, scheduled to occur during the sixth five-year plan.

The need for middle level manpower in the labour force structure will continuously increase during the coming development stages, and therefore serious attention should be paid to technical and vocational education.
The new guidelines of the state policy (GBHN) of 1993 has given clearly the direction of the development of the country in the future. The central development of the second long-term development (1994–2019) and PELITA VI (1994–1999) is the development of economy and human resource development. Education as the main means of the development of human resources must clearly play the role of forming the students to be the national asset. They have to be productive and earn their own living. They also should have the ability to create excellent product of Indonesian industry in confronting competition in the global market.

3. THE TECHNICAL AND VOCATIONAL EDUCATION SYSTEM

3.1 THE ORGANISATIONAL STRUCTURE

The Ministry of Education and Culture (Depdikbud) has the function of maintaining and developing the education and culture of the country. The Minister (Menteri) assists the President in the field entrusted to him.

At the national level the Minister is assisted by Secretary-General (Setjen) in doing the secretariat tasks to support the administration functions and by Director Generals (Dirjen) for Academic and Culture Development. At regional levels the Minister is assisted by the Head of Regional Office (KANWIL) who plays the roles and the functions of the Minister in the Province.

The formal education system in Indonesia consists of six-year primary school, three-year junior secondary school, three-year senior secondary school and higher education ranging from one to six years.
Children enter primary school at the age of six. At the end of their primary education they are admitted to junior secondary schools. Advancement from junior secondary school to senior secondary school is through selection.

Specialisation in education commence at the junior and secondary levels of education. The various specialised secondary level programs are organised and offered separately and managed by different Directorates in the Ministry of Education and Culture. Overall coordination is held by Director General or Primary and Secondary Education (Ditjen Dikdasmen).

The technical and vocational education as a system in the primary and secondary education is organised under the Directorate of Technical and Vocational Education of the Director General of Primary and Secondary Education, consisting of Junior Technical and Vocational School and Senior Technical and Vocational Schools.

3.2 THE CURRICULUM

The 1984 curriculum has been implemented in senior technical and vocational schools since 1984. The curriculum 1984 is grouped into six technical and vocational areas:

1. Agricultural and forestry
2. Engineering
3. Business and commerce
4. Home technology
5. Health and social works
6. Art and craft

Each group consists of one or more clusters and one cluster comprises one or more study programs.

The pattern of the curriculum structure contains:

- general program consisting of normative subjects that must be followed by all students and has a function of forming good Indonesian citizens (30 percent)
- basic vocational subjects containing adaptive subjects which aims at preparing lifelong education and adjustment to the development of science and technology (30 percent).
- vocational subjects consisting of subjects for forming productive competencies applicable at the relevant field of work (40 percent). This optional program can be chosen by the students at the second year based on their talents, interests and aptitudes.

Characteristics of the curriculum area:

- oriented toward the world of work
- the first year of each cluster is a common year to widen the horizons of the students in each cluster before choosing a study program in the cluster
- theory and practice is integrated

- based on a semester system
- the teaching and learning approach is a process skill (learning to learn)
- implementation of career guidance program
- on-the-job training is given to all students in semester 5 for three-year program and semester 7 for four-year program. The duration of the on-the-job training varies between two weeks and three months.
- to some extent the teacher may adjust the teaching materials using local resources as sources of teaching and learning

Through the Minister decree of February 23, new curriculum 1994 was introduced. This new curriculum was developed based on the new education law (UUPN) of 1989.

The national education goal is to develop the intellect of the national life and the Indonesian citizens who believe in God, having high morals, knowledge and skill, physical health and spirit, sound personality, self-attitude and have the sense of responsibility and nationality.

Practically there is no difference between the 1994 and the 1984 curriculum except in the following:

- the program is conducted in 9 quarterly periods for three-year program and 12 quarterly periods for the four-year program, while the 1984 curriculum is conducted in 5 semesters and 8 semesters.
- the lesson period is 42 of 45 minutes per week, while the 1984 curriculum is only 40 of 45 minutes per week
- the structure of curriculum 1994 consists of 24 percent for general program and 76% for vocational program, while the 1984 curriculum consists of 30 percent for general subjects and 70 percent for vocational subjects
- the 1994 curriculum is also supplemented by profile of competencies for each study program.

For the success of the achievement of the professional skill of the students the Minister issued a decree (1993) that arranges the pattern of teaching learning implementation as the realisation of the link and match policy which is as follows:

- make use of a production unit at school that is professionally managed as a mean of professional skills training
- carry out part of professional skill training at school and the other part in industry
- carry out all the professional skill training in industry

3.3 THE TEACHER TRAINING FOR TECHNICAL AND VOCATIONAL EDUCATION

Success in carrying out educational programs or curriculum neither depends on the educational programs themselves, nor the availability of educational facilities only, but also and more importantly on the number and qualification of teachers. The providing of teachers including technical and vocational teachers is through the faculty of education of a university or teacher training institute (IKP). The graduates with a Diploma III (D III) or degree (Drs) qualification, are qualified to be the teachers at senior technical and vocational schools.

The graduates have good academic credentials to qualify them to teach technical and vocational subjects, but they lack practical teaching and vocational skills relevant to industrial and business requirements. To solve the problem of providing qualified teachers and the shortage of technical and vocational teachers at the technical and vocational education, the Ministry has set about The Centre for Development and Teacher Upgrading (PPPG).

These are:

For technical education

- Technical Teacher Upgrading Centre (TTUC) Bandung, West Java
- Technical Teacher Upgrading Centre (TTUC) Malang, East Java
- Technical Teacher Upgrading Centre (TTUC) Medan, Sumatera

For vocational education

- Vocational Teacher Upgrading Centre (VTUC) Jakarta, Java

For arts and craft

- Vocational Education Development Centre (VEDC) Yogyakarta, Middle Java

For agriculture

- Vocational Education Development Centre of Agriculture (VEDCA) Cianjur, West Java

There are three major types of programs in the centres:

- The three-year diploma program (D III), conducted under the cooperation with the IKIP (institution-based program for D III program)
- Master teacher training program (school-based activities of D III program)
- Inservice upgrading program for teachers and school supporting staff including administration staff

In addition to training programs, each centre has also the responsibility for giving advice and guidance to the integrated development program of certain numbers of schools under its responsibility.

3.4 THE ROLE OF THE MINISTRY OF MANPOWER

Providing skilled and trained manpower is also the responsibility of The Ministry of Manpower. Its service is to carry out training for youth of 18 to 45 years of age who are no longer following the formal education system.

Various trades are introduced under training programs. The courses are more specialised compared to courses of formal schools. There are generally three levels of course consisting of basic, intermediate and advanced with about 600 training hours each.

The Ministry of Manpower also gives services to industries by conducting special training to suit the needs of each individual industry and lately has also implemented an apprenticeship program.

4. THE DEVELOPMENT OF TECHNICAL AND VOCATIONAL EDUCATION

4.1 STAGES OF DEVELOPMENT

Before 1969 the system of technical and vocational education in Indonesia was the continuation of the colonial system. The number of schools and student enrolments had rapidly increased since Independence, but it was not followed by the provision of facilities, especially equipment for workshop practice.

The development of technical and vocational education in Indonesia after 1969 and the implementation of the National Development Plan can be generalised in two stages.

The first stage is the stage of establishment (1969–1989) where the main effort is to increase the number of schools for accommodating the children of school age and giving them vocational training for their future living. The second stage starts in 1989 where industry in business shows successful development not only in the country but also in the world. At this stage the development program of technical and vocational education is focusing on improving the quality by trying to link the school more closely to industry and business. The direct involvement of industry is continuously to be carried out for the success of providing professional skill manpower.

4.2 THE PERIOD OF ESTABLISHMENT (1969–1989)

Indonesia has given an important attention to the development of technical and vocational education to support the national commitment to enhance economic development. Indonesia is aware that skills and knowledge required by the modern economy are different from those required by an economy based on traditional agriculture and handicraft production. New and more sophisticated skills must be developed as one of the important requirements for economic growth.

During the first five-year development plan (PELITA I, 1969–1974) efforts were aimed at developing an education system to suit national development. The shortcomings of the previous system were analysed and steps were taken to overcome them. A middle-level technical education system oriented toward manpower needs was developed based on creating a balance between manpower needs for industrial expansion, educational aspiration of the community, and abilities needed for the development in the broadest sense, covering skills, intelligence and health attitude toward work.

The strategies of the second five-year development plan (PELITA II, 1974–1979) among others were: expansion of work opportunities; industrial development, especially those that support agricultural products, and preparation of the coming industrial growth; elevating social and educational sectors of the community; and a balance between regional and national development.

During REPELITA III (1979–1984) and also REPELITA IV (1984–1989), special attention was given to further improving technical and vocational education in quality as well as the increase in quantity.

Specifically, the development program was as follows:

1. Quantitatively the enrolment was increased so that schools could accommodate a large number of students of school age.

2. Qualitatively the technical and vocational education graduates were improved by improving programs, teachers and school facilities.

3. Relevancy of technical and vocational education and industry was made by linking and matching the curriculum with the needs of industry and world of work.

4. Effectiveness was raised by developing educational programs to produce technical and vocational schools' graduates who are suitable for the development of the country.

5. Efficiency was raised by providing the quality of educational management which are more coordinated and integrated.

However, the main mission of technical and vocational education was still on the quantity, the providing of large number of student places at technical and vocational schools. The total number of public and private technical and vocational school students which in 1983/1984 was only about 540,000 was projected to increase up to more than 1.1 million in 1988/1989 for the fulfilment of the development need.

The realisation of the development can be seen not only from the increasing number of student enrolments, but also from curriculum improvement, the number of upgraded teachers, and the improvement and establishment of buildings and school facilities, including books and workshop equipment.

At the beginning of the fifth five-year development plan (1989) there were 267 junior technical and vocational schools and 649 senior technical and vocational schools. They are:

- 74 junior schools for family welfare (SKKP)
- 193 junior schools for engineering technics (ST)
- 90 senior schools for family welfare/home technology (SMKK)
- 14 senior schools for social workers (SMPS)
- 324 senior schools for economy and business (SMEA)
- 165 senior schools for engineering technics (STM)
- 31 senior schools for agriculture (SMT Pertanian)
- 25 senior schools for art and craft (SM Kesenian dan Kerajinan)

Besides those schools above, there are also nine Technical Training Centres (TCC) for workshop practice for senior school students of engineering technics in Jakarta, Bandung, Semarang, Yogyakarta, Surabaya (Java), Medan, Padang, Palembang (Sumatera) and Ujung Pandang (Sulawesi). The students are enrolled in their feeder STMs. The theory classes are conducted at the feeder STMs and the practical workshops at the TTC for two full days (16 hours).

Those figures above are the number of public schools. In addition to the above public schools, there are also a number of private senior technical schools. The number of private schools is about four times, although the number of students is only twice that of public schools.

4.3 THE ISSUE OF QUALITY IMPROVEMENT

The aim of senior technical and vocational education is to provide middle level workers who have the qualification that suit the requirements of the world of work, having the ability to improve themselves in skill and knowledge and continue their study at a higher level of education.

Schools, especially technical and vocational schools should be effective and efficient. The program provided by technical and vocational education should be developed in line with the development of

technology to support the growth of industry and services in trade and business.

To guarantee the relevance of technical and vocational education and the requirements of the users, linkage between the schools and the world of work should be made through the establishment of cooperation and partnership at the school level, regional level and national level, so that mutual benefit could be obtained.

For the sake of the quality, the graduates should have standardised skill and competencies that are required by the world of work. A professional examination system should be organised by the schools and the users so that the skill and competencies are accredited by the world of work. All these efforts should be conducted besides the development and improvement of curriculum, teaching and learning facilities and upgrading of teachers.

4.4 THE EFFECTIVE SCHOOL

Research suggests that effective schools are those with a significant amount of autonomy and with a solid sense of community. Effective school research also emphatically concludes that there does exist a series of factors that the best overall schools, the most effective schools, share in common.

Rosemary G Nagel et al. in *A Design for Effective Schools* (1985:85,86) describes effective schools, quoted as follows:

Most of the research identifies five common factors. These are:

1. Strong leadership by the principal or another staff member
2. High expectation by staff for student achievement
3. A clear set of goals and emphasis for the school
4. A schoolwide effective staff training program, and
5. A system for monitoring of student progress

An effective school is one that:

- has a clear vision or sense of its purpose
- provides a pleasant and orderly climate
- promotes itself as a place of learning, emphasising academic work and prescribing a body of knowledge and skill to be learned
- emphasises rewards rather than punishment
- has high expectation of students and staff
- encourages various means of staff development
- enjoys and fosters strong support from parents and community
- has strong instructional leadership
- has a principal who models appropriate behaviour, is visible in the building and at school events, sets the tone and vision of the school, supports inservice programs, monitors classrooms, supervises instruction and provides opportunities for teachers to plan together

- has quality teachers who prepare lessons in advance, start classes on time, focus on academic tasks, tend to teach the class as a whole but with a variety of techniques, possess high expectations, assign and check homework, continually monitor and provide feedback for students, administer discipline in a firm, consistent manner, treat all students in the same fashion, give students adequate time on tasks so that they may attain appropriate levels of achievement, and openly display the work of the students

- treats its students with respect, giving them responsibilities in operating the school, encouraging them to own the building and insisting that they be active in their own learning

- celebrates its teachers and students by providing rewards based on merit

- reduces all classroom disruption

4.5 THE POLICY AND STRATEGY OF QUALITY IMPROVEMENT

The overall policy of the development of technical and vocational education is to improve the quality of education so that the graduates will have competencies, skill and professional attitudes needed in industry and the job market.

The policy in the fifth five-year plan is on emphasising the improvement of quality through consolidation. This is basically improving and maintaining the quality of each individual school including all aspects.

Consolidation will be carried out through:

1. Limitation of Study Program

   Establishment of a new study program will only be provided after a thorough study of its efficiency and effectiveness. This is to make the school concentrate on the success of the existing program.

2. Renovation of Subject Content

   To anticipate the development of science and technology, subject content should be modified and changed. Each school has an opportunity to modify or renovate the subject content according to the local need.

3. Upgrading of Teacher and Staff

   New invention in science and technology will claim new skill and knowledge, so that refreshing and upgrading should always and continually be conducted for teachers and staff and school managers as well.

4. Certification and Professionalism

   The increase in growth of the services trade and industry require the improvement of professionalism. To guarantee that the individual performance is relevant to the need, the professionalism of each individual should conform with the performance standard determined by the users. Certificates of technical and vocational schools' graduates should be accredited by the users. The involvement and establishment of an Advisory Committee in the school system and final examination could guarantee the appropriateness of the standard quality of the graduates.

This examination system should assess:

(a) the level of skill in psychomotor domain

(b) professional attitudes in terms of affective domain

(c) adaptability to the development of science and technology in terms of cognitive domain

5. Selection of Student

The success of the technical and vocational education will also depend on the quality of the students. This can be done through a systematic selection which is mainly based on talent and interest.

6. Career Guidance

Career guidance will facilitate the student in understanding him/herself, and will foster their choice and future profession.

7. Tracer System

Tracer system will help the school institution in getting the feedback from graduates and industry of the appropriateness and inappropriateness of the graduates as well as the program.

8. Facility

Improving the quality has the consequence of providing the standard need of facilities required by the curriculum. In addition to procuring new equipment and facilities, the existing ones should also be upgraded or renewed.

9. The Improvement of Management

The complexity of technical and vocational education will demand a different school management from others. The improvement of management should be focused on:

(a) improving the efficiency and the effectiveness of education to promote the autonomy of the school

(b) promoting cooperation with industry and the world of work

(c) increasing the efforts of providing operational school budgets

The strategy of improving the quality of technical and vocational education will be based among others on integrated school development, production unit, and institutional partnership.

5. THE INTEGRATED SCHOOL DEVELOPMENT

The integrated development is school-centred, focusing on the school, occurring at school and conducted by the school. All the efforts are aimed at the improvement of the quality of the school, the increase of efficiency and the effectiveness of the school. Basically integrated school development promotes the autonomy of a school.

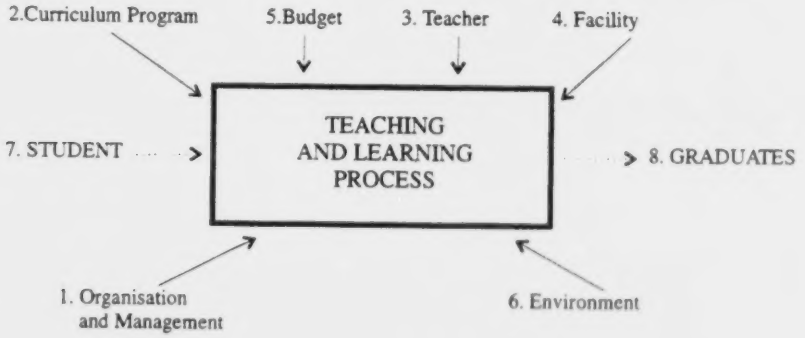
Some principles of the development are:

1. The integrated development should take place at the school.

2. The first step is to consolidate the management of the school, so that it initiates and mobilises all activities in improving the efficiency and the effectiveness of the school integratedly. It starts from planning, implementing, evaluating and all aspects of management activities conducted by the schools.

3. For accelerating the process of integrated development, a number of schools will be assisted by the Centre for Development and Teacher Upgrading (PPPG). The assistance of the Centre is to guide and support the process of the development. On the other hand, the involvement of the Centre at school will not influence and reduce the function of the official supervision of the existing organisation system of the Regional Office.

The integrated development approach demands all activities and school components be inter-related, depending on each other, and influencing each other in a system which can be drawn as follows:



1. Organisation and Management

Effectiveness of the school resources involved in the teaching learning process is determined by the quality of the management and the organisation as a tool for achievement of objectives. The school principal has an important role in the success of the implementation of the development program. The teacher and all the staff must play a role of their own in implementing the program based on the effective school organisation.

2. The Program/Curriculum

Each school that implements the integrated development has the possibility of modifying the subject content of the curriculum based on the need and the relevance of world of work. The content of the subject should be developed cooperatively with the local industry, however the national curriculum could not be changed. The modified subject content has the aim of improving the quality of the graduates so that they can be easily absorbed by the local job market.

3. The Teacher

The quality and the number of qualified teachers are important aspects in producing qualified graduates. Each school of this integrated program should have an analysis of need for teacher and has a continuous upgrading and career development of teacher. Opportunity of each teacher to go and work in industry is encouraged besides attending seminar, workshop and other upgrading programs.

4. The Facilities

The idea of integrated development approach is mainly the optimisation of the use of the existing school facilities, besides obtaining the procuring the new equipment. Each school in this program should maintain the equipment continuously and systematically according to an effective system. Damages should be repaired promptly, so that it will not disturb the teaching and learning process. To support the teaching and learning process each school must have a library which provides books for students.

5. Operational Budget

Operational budget should include:

- materials for theory and workshop practice
- operational budget for facilities, including power, electricity, lighting and water
- operational budget for maintenance and repair

6. Environment

A school as a part of the environment should maintain and take care of the environmental conservation.

7. Student

School has the function of educating students. The quality of student plays an important role in the success of education. Student selection should be conducted based on talent and interest.
During the school year, students are introduced to career guidance which has the functions of:

- assisting the students in selecting study programs which suit their interests and talents related to the work prospect in the future
- assisting the student in solving learning problems

8. The Graduates

Each school has to compete with others in producing qualified graduates. System of final examination by involving the user will be beneficial to the school in maintaining the standard of the graduates.
A school of integrated development has the responsibility of marketing the graduates. Similar to marketing theory, schools have to consider the following:

- Studying the Job Market

  Each school continuously has to monitor the job market and anticipate the future. Links and cooperation with industries is recommended. Each school should have the list of industry, enterprises and institutions that have and will possibly absorb the graduates.

- Promotion

  Schools have to promote their quality to the user and the community. This could be done through conducting open day, leaflet, brochures, etc.

- Tracer System

  Each school should have an effective tracer system. Data of graduates should be kept up-to-date. Alumni organisation is recommended. School alumnis are potential people for marketing the graduates.

6. PRODUCTION UNIT

One of the aims of the 1984 senior technical and vocational education curriculum was the development of self-attitude and the ability of being entrepreneurial. Although the curriculum has a vital portion (40 percent) of practical work compared with the earlier curriculum, the success of the entrepreneurship and self-attitude should be supported by real activities in the real work.

Practical work in the workshop consumes a lot of money, while operational cost for purchasing materials, maintenance and repair is very limited. In addition, the practical work results cannot be utilised due to the inappropriateness of the suitability of production value. For the efficiency of the technical and vocational education it will be worthwhile if the practical activities could facilitate the breed and student in acquiring the self-attitude and entrepreneurship. These activities are called PRODUCTION UNIT.

Production unit of a school should have activities for producing goods or giving services by utilising all the resources at the school. Simultaneously it could cover the activities of the existing programs in the school and in turn could be a good place for doing the workshop practice in the teaching and learning process. The production unit has to be taken seriously, so that all managing personnel should have entrepreneurial skills and commercially-based managerial skill. For the effectiveness of production unit, the cooperation of schools and industry should continuously be made.

Through production unit at school the following advantages could be achieved:

- the process of guiding and appreciation development of attitude value and self-behaviour and entrepreneurship of the student
- the process of matching student competencies to the standard competencies of the world of work
- a real effort of obtaining funds for educational process

The concept of production units in the agricultural schools was formalised with December 1986 guidelines of Directorate of Technical and Vocational Education (DTVE) on the development of production units in agricultural schools. The concept carries the dual objectives of providing practical laboratories for agricultural skills training of students and generating income to augment the school financial resources for sustaining operations and maintenance. In addition to gaining agricultural scale, students earn credits in the form of exemption from school tuition fees based on school income derived from what has been produced by students on a curricular basis. Students earn extra income for their involvement as available and as needed in the operation of production units after school hours.

The actual widespread implementation of agricultural schools' production units started in 1988–1989 as the result of the July 1987 instructions from the Regional offices on how to establish the production units. An average of 50 million Rupiahs (equal to US$25 000) per school was earmarked as DTVE investment for this activity to pave the way for development of school self-reliance under PELITA V (19898–1994). Actual releases of fund were based on merits of proposed projects submitted by schools. Evaluation was done by Regional Offices following DTVE criteria on project profitability, contribution to the learning process of students, and significance to the community, especially the farmers.

The production unit in agricultural secondary schools is the integration of production and processing aspects of agronomic and horticultural crops for crops cluster; ruminant and non-ruminant animals for the animal husbandry cluster; and marine, brackish water and fresh water fish culture for fisheries.
Besides agricultural schools, most of technical and vocational schools have conducted production unit, although in simple ways and not well organised.

Through the Ministerial decree, as stated above, production unit at school that is professionally managed can be considered as a means of professional skills training.

In November 1993, a model of production unit has been developed in Bandung TTC, where the TTC and a private enterprise work together to establish a joint venture for the organisation of production unit carried out by building, electronics, electrical, mechanical and automotive sections of the TTC. The management of the production unit is carried out by an executive committee consisting of TTC staff and people from the enterprise.

The objectives of the cooperation are:

- to support technical skill training and education activities for TTC students
- to create a source of income for the TTC and the enterprise

- to create job opportunity, breeding industry and business minded, apprenticeship and on-the-job training opportunities for TTC students

In this cooperation, the TTC provides:

- the workplace
- machines and other relevant facilities
- the relevant expertise of TTC staff

while the enterprise provides:

- funds
- relevant expertise
- maintenance of facilities

The first step of the cooperation is producing furniture products in the building section and making machine components in the mechanical section. The involvement of students and teachers in the production process in real experience of producing marketable products will give them valuable experience of how quality and work speed are measured for the acceptability of the work result.

Through this cooperative model, the weaknesses of marketing which pervade the production unit at schools could be solved by the availability of marketing expertise of the industry as the school partner. This is obvious, when the furniture produced by the TTC could enter the world market and becomes an export commodity.

7. INSTITUTIONAL PARTNERSHIP

Linking technical and vocational education institutions and industry should be carried out continuously to improve the quality of the graduates. The involvement of industry and the world of work should be started from the planning stage, and continue with the implementation, evaluation and placement of graduates. This is to guarantee the relevance of the technical and vocational education as the work force producer, and industry as the user.

The form of cooperation at the planning stage could be in curriculum development, syllabi, preparing a list of new equipment, proposing new locations and new study program. In the implementation stage, the form of cooperation could be provided on the job training both for students and teachers, the use of facilities in industry by the school institution or the use of school facilities by industry, the use of expertise by both sides having mutual benefit.

The cooperation in the evaluation stage could be conducted in the involvement of trade test and the validation of the program. Through this cooperation, industry will also participate in the placement of graduates. This cooperation with industry is the realisation of the education law, that the responsibility of education is not only on the Government's shoulders but also on students, parents and the community.

The 1992 Ministerial decree points out the activities of cooperation as follows:

1. Inform each other on the development of technological science and arts
2. Inform each other on the supply and demand of manpower
3. Make use of resources of both sides
4. The opportunity to improve the skill and keep the competence of the staff up-to-date
5. Cooperation on production unit and promotion activities

6. On-the-job training for students and work experience in industry for teachers

7. Evaluation of curriculum and learning result

8. Certification of vocational skill

9. Placement and tracer study

Most technical and vocational schools maintain cooperation with industry for carrying out on- the-job training program of their students based on the curriculum requirement. Some schools have organised a link with industry by establishing an advisory committee. The output of the committee among others is a validated curriculum which suit the needs of local industries.

To support the growth of tourism industry, the technical and vocational education organises education for providing manpower in the field of travel, hotel management, food services and bakery. The close cooperation between these study programs and relevant industry has been successfully maintained since the planning stage of the curriculum, the development and the implementation of the program including regular on-the-job training of the students in the real work of tourism industry.

The cooperation of school institution and industry could be institutionalised in the form of institutional partnership that has mutual benefit.

A model of institutionalised cooperation is established between Aviation Senior Technical School in Bandung and the IPTN (Nusantara Aeroplane Industry), where the IPTN donates machines and materials for student workshop practice as well as on the job training both for teachers and students. Jobs for the graduates have also been provided, especially for all the first batch of graduates (1988). It is planned that the form of involvement of IPTN in the future (starting 1994) will be in the form of an apprenticeship program.

The cooperation between the Bandung Aviation Senior Technical School has also been maintained with the national and private aviation enterprises such as Garuda Indonesia Airways, Merpati and Mandala especially in the employment of the graduates.

8. THE DUAL SYSTEM

A new development of the technical and vocational education program is emphasising a dual system of apprenticeship. Although the system has been known for a long time, the implementation of the system has only been successfully conducted in 1989 when the new SMT Perkapalan Surabaya (Senior Technical School of Shipbuilding Trade) was organised by the Ministry of Education and Culture and PT.PAL (A shipbuilding enterprise).

The school building and some basic equipment as well as theory subject teachers were provided by the MOEC, while the PT.PAL provided workshop practice, on-the-job training and apprenticeship program. The curriculum was developed cooperatively between the MOEC and PT.PAL. During the three-year school program, practical work training of two-to-three full days per week is conducted in industry (PT.PAL), while the remaining days of the week are used for theory at school. The apprenticeship program is carried out for six full months after the final examination of the three-year school program, so that the total training duration is three-and-a-half years. At the end of the apprenticeship program a final examination is conducted by industry.

In 1993 the policy of apprenticeship was launched by the new minister and will colour the new era of technical and vocational education development. The apprenticeship system will be widely introduced as a very effective model in approaching the relevance between supply and demand of manpower, as the realisation of the Ministry of Education policy of 'Link and Match'.

The level of professional manpower skill involved in the production process will determine the quality, production cost, and final product, which then determines the ability to compete. Indonesia requires high professional

manpower skill to face the development of global economy at the moment and in the future.

Technical and vocational education should produce professional skilled workers. Professional skill could be achieved through dual system, an education conducted at school and industry. Direct experience through the real work in industry with the guidance and supervision of professional workers and in an industrial atmosphere should be part of the technical and vocational education system.

The apprenticeship system is a form of educational operation for professional skill that systematically and synchronously integrates the educational program at school with the skill competencies program obtained through work activities directly in the world of work, aimed at achieving a determined level of professional skill.

Basically the apprenticeship program is a cooperative program of the school and its partner from industry/business. The implementation should be discussed and be agreed by both sides. The normative and adaptive aspects of the curriculum are fully carried out by the school and are the responsibility of the school. The basic profession could be carried out in industry and is the responsibility of school and industry. The professional component is fully the responsibility of related industry/business. The apprenticeship program can be carried out in the form of day releases or block release.

The implementation of apprenticeship system has the following objectives:

- to produce manpower with professional skill (with level of knowledge, skill, and work spirit relevant to the demands of the field of work)
- to strengthen the 'link and match' between school and world of work
- to increase the efficiency of educational process and training of manpower with professional quality
- to acknowledge and appreciate the work experience as part of the educational process

The dissemination of the apprenticeship and dual system concept will continuously be carried out to the community and especially to industry and world of business. In the school year of 1994/1995 the dual system will be conducted at about 200 senior technical and vocational schools and will be participated in by more than 2400 enterprises.

9. CONCLUSION

The development of technical and vocational education in Indonesia during the first long-term development (1969–1994) has shown an encouraging improvement.

1. The overall developments are as follows:
   - the establishment of the middle level technical and vocational education system based on manpower needs
   - the increase number of technical and vocational schools for accommodating the increase number the school age children
   - the wide range of programs of technical and vocational education to provide manpower need in accordance with the development of science and technology and the development of industry, services, trade and business. The programs are grouped in agriculture and forestry engineering technology, business and office affairs, health and social welfare, home economics and culture
2. The efforts of improving the quality and the effectiveness of technical and vocational education has been conducted through:
   - the procurement of buildings, equipment, text books and learning aids for improving the teaching and learning process

- the improvement of curriculum especially for accommodating the local needs
- the upgrading of teachers and school staff including the improvement of school management capabilities
- the implementation of an integrated school development approach

3. For the improvement of efficiency of schools each school is encouraged:
   - to conduct production unit as a means for the fostering of entrepreneurship and obtaining additional budget for teaching and learning process; to promote gradually the management of production unit into professional business
   - to work out clear cooperation with industry and business in the stages of teaching and learning process starting from planning to evaluation and placement of the school graduates; to improve the cooperation gradually so that the 'institutional partnership' could be established
4. Further improvement on quality will continuously be carried out through the apprenticeship system as the realisation of forming professional skills through dual system, a systematic and synchronous education conducted at school and industry.

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APPENDIX I

GLOSSARY

BLPT	Technical Training Centre (TTC)
Depdikbbud	Ministry of Education and Culture (MOEC)
Diploma III	Three year diploma program
Ditien Dikdasmen	Directorate General of Primary and Secondary Education (DGPSE)
Dit Dikmanjur	Directorate of Technical and Vocational Education (DTVE)
Drs	Degree holder of IKIP graduates or faculty of education of a university
GHBN	The outline of National State Policy
IKIP	Institute of Teacher Training
IPTN	Nusantara Airplane Industry
KANWIL	Provisional Regional Office of the MOEC
PELITA	Five Year Development Plan
	PELITA I, 1969-1974
	PELITA II, 1974-1979
	PELITA III, 1979-1984
	PELITA IV, 1984-1989
	PELITA V, 1989-1994
	PELITA VI, 1994-1999
PPPG	Centre for Development and Teacher Upgrading
	TTUC - Technical Teacher Upgrading Centre
	VTUC - Vocational Teacher Upgrading Centre
	VEDC - Vocational Education Development Centre (Art and Craft)
	VEDCA- Vocational Development Centre of Agriculture
PT.PAL	Ship Building Enterprise
PJPT	Long Term Development
	PJPT I , 1969-1994
	PJPT II 1994-20198

Rp.	Rupiah (1 US$ - Rp. 2,100.00)
SKKP	Junior School for Family Welfare
SMEA	Senior School for Economy and Business
SMIK	Senior School for Handicraft Industry
SMIP	Senior School for Tourism Industry
SM Kesenian	Senior School for Arts and Craft
SMKK/SMTK	Senior School for Family Welfare/Senior School for Home Technology
SMPS	Senior School for Social Worker
SMT/STM Pertanian	Senior School for Agriculture
STM Industri	Senior School for Engineering Technics (and Special Trades, Graphics, Shipping, Aviation, Chemistry)
ST	Junkor School for Engineering Technics
UUUPN	Education Law

APPENDIX II

Comparison of Number of Students of TVE at the End of 1983/1984 and 1988/1989 (Public and Private)

		At the end of Pelita III			At the end of Pelita IV		
Types of School		Public	Private	Total	Public	Private	Total
A. Junior Secondary School							
1	SKKP	9615	2125	11740	15224	1494	16718
2	ST	60433	8111	68544	75733	7677	83410
TOTAL (A)		70048	10236	80284	90957	9171	100128
B. Senior Secondary School							
3	SMKK	16351	14773	21124	35460	8415	43875
4	SMTK	2729	0	2729	4459	0	4459
5	SMPS	2842	0	2842	5637	8928	14565
6	SMIK	2533	0	2533	4547	405	4952
7	SMKI	2739	0	2379	5022	512	5534
8	SMM	206	0	206	547	0	547
9	SMSR	1460	0	1460	2615	231	2846
10	SMEA	148603	122743	271346	233140	389317	622357
11	STM/P/ BLPT	91191	122637	223828	137461	290596	428057
12	STM Kh	1860	0	1860	3651	7162	10813
13	SMT PER	7656	0	7656	14015	18059	32074
14	SMFA	0	0	0	0	1877	1877
15	SPbMA	0	0	0	0	3854	3854
16	SMIP	0	0	0	0	2910	2910
Total (B)		278170	260153	538323	446554	732166	1178720

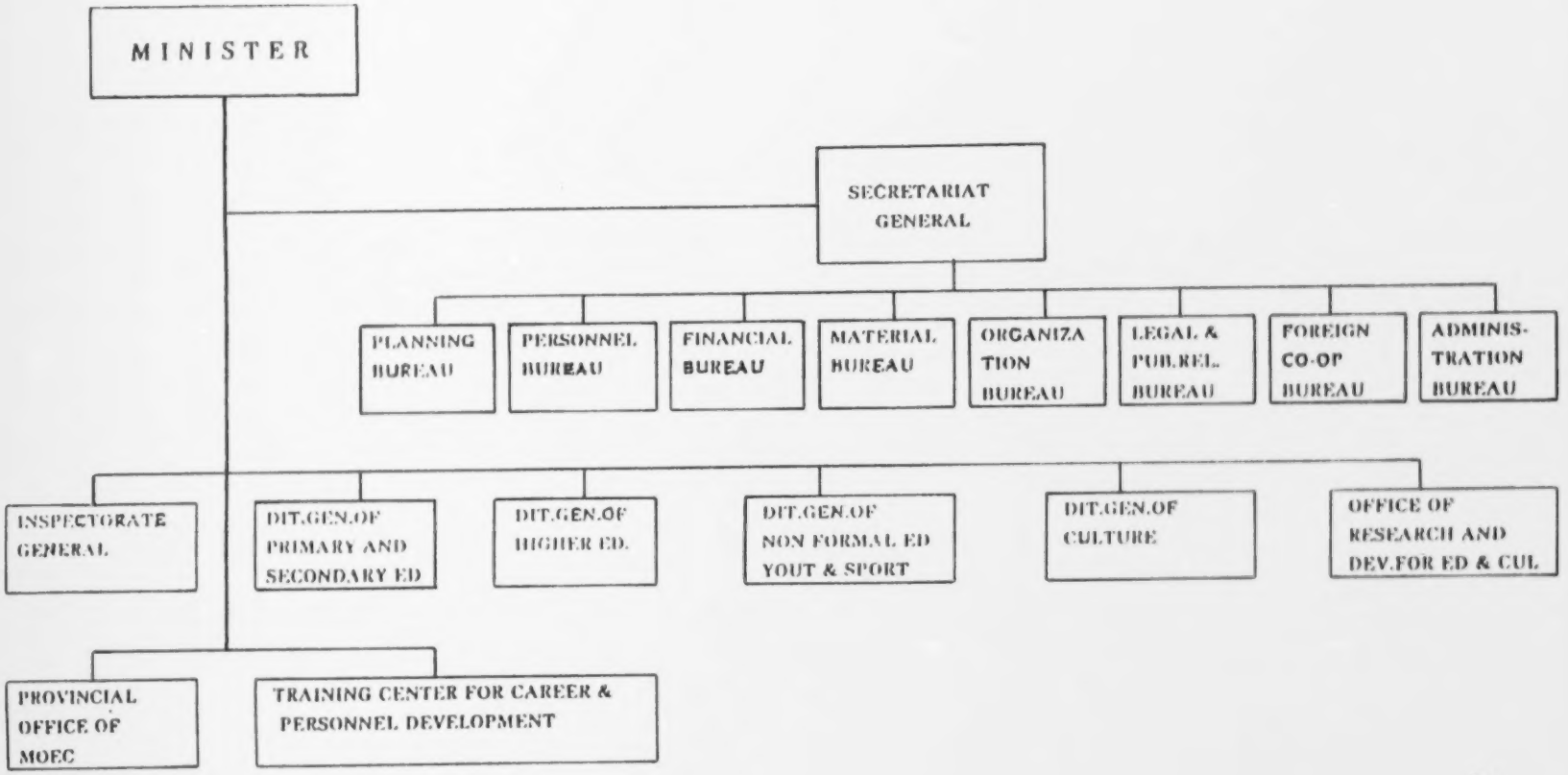
Notes:

7, 8 and 9 : **Senior Schools for Arts and Craft**
11 and 12 : **Senior Schools for Engineering Technic and Special Trades**
13, 14, and 15 : **Senior Schools for Agriculture**

Source: Directorate of Technical and Vocational Education

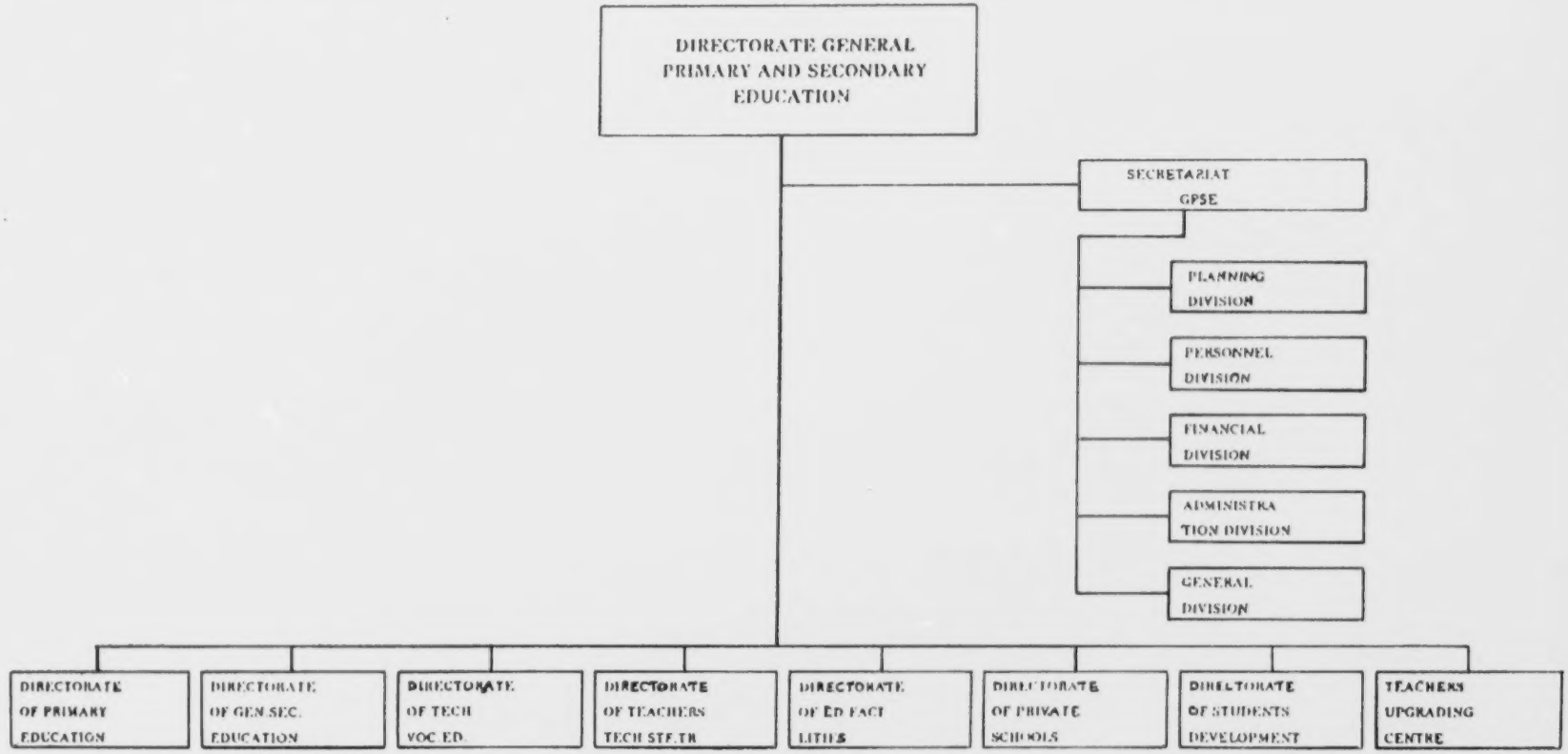
APPENDIX III

Organisational Structure of The Ministry of Education and Culture



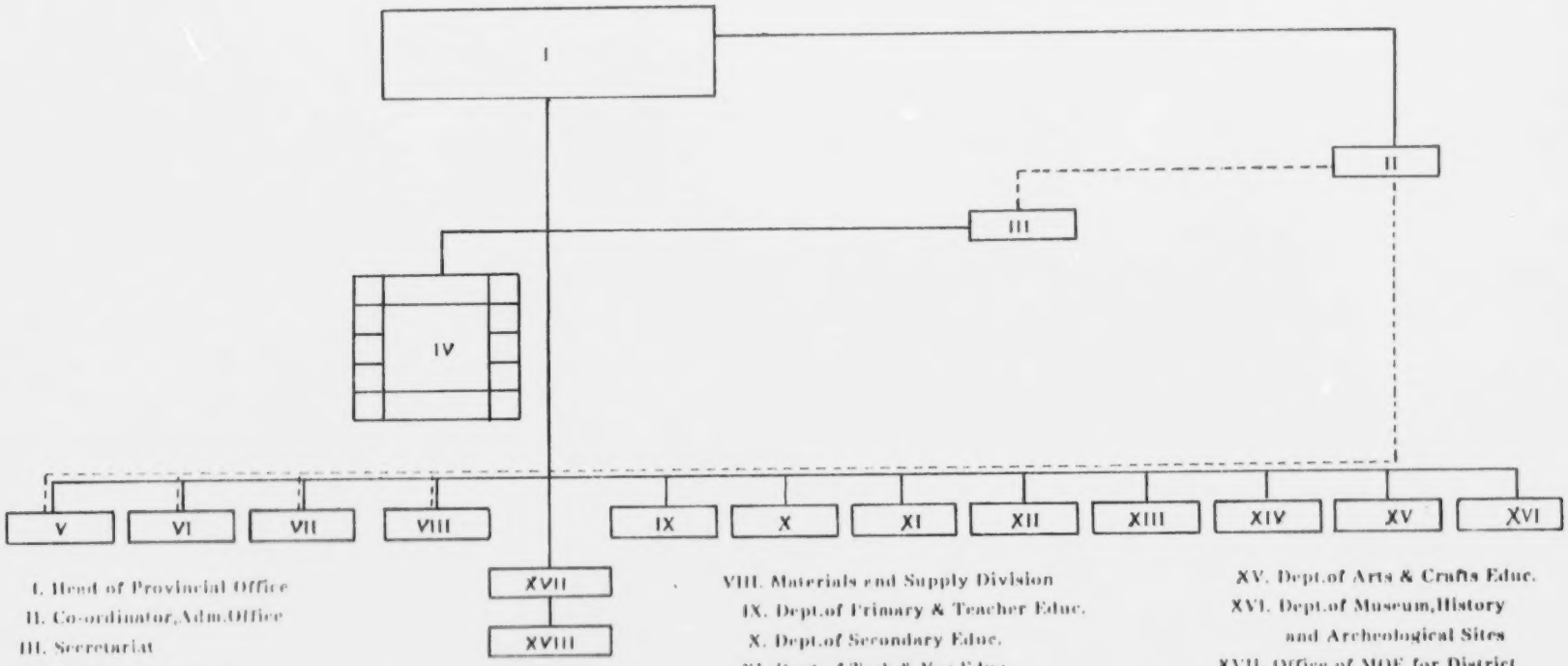
APPENDIX IV

Organisation Structure of the Directorate General of Primary and Secondary Education (DGPSE)



APPENDIX V

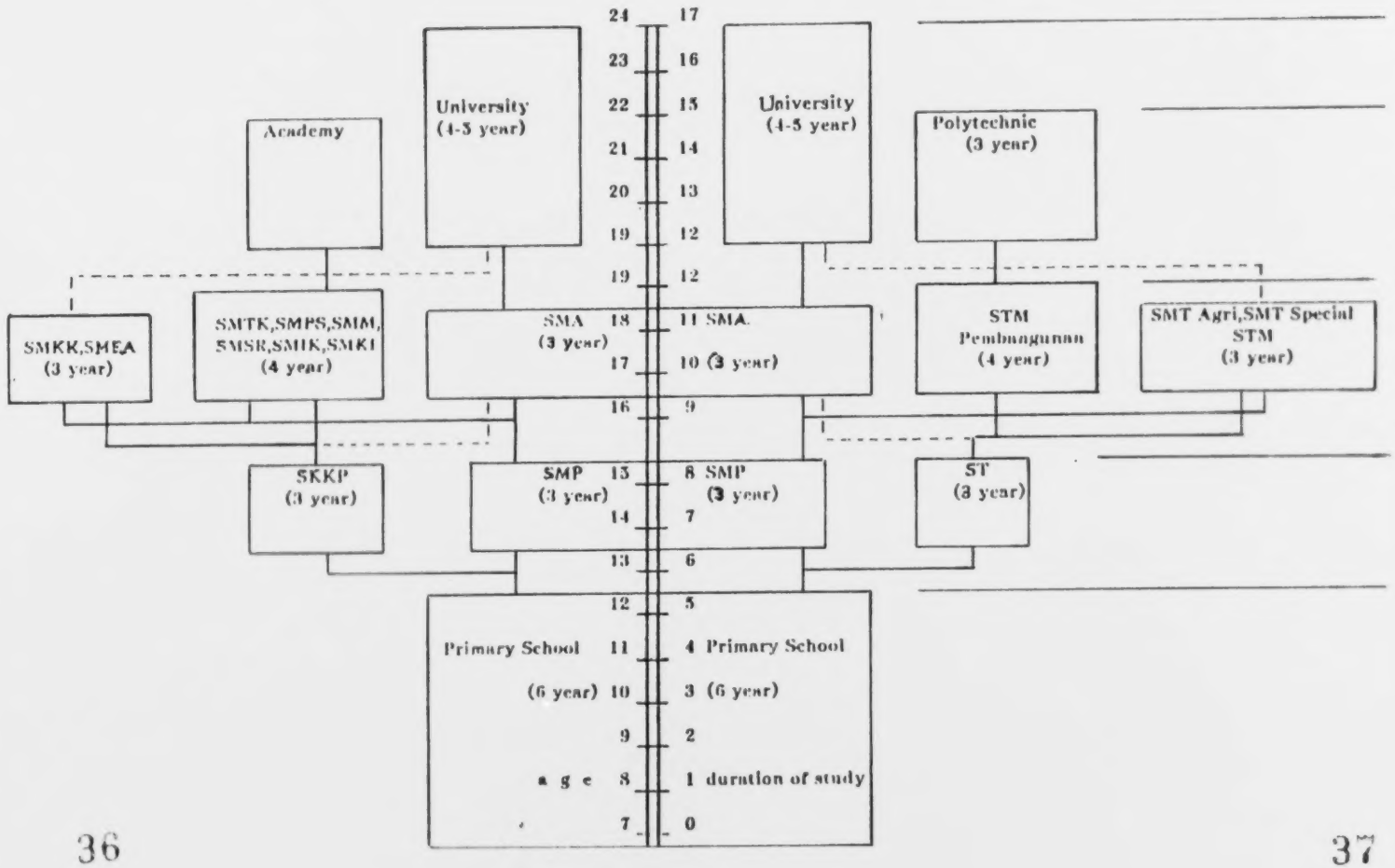
Provincial Education Office Structure



I. Head of Provincial Office
II. Co-ordinator,Adm.Office
III. Secretariat
IV. School Supervisors
V. Planning Division
VI. Personnel Division
VII. Financial Division
VIII. Materials and Supply Division
IX. Dept.of Primary & Teacher Educ.
X. Dept.of Secondary Educ.
XI. Dept.of Tech.& Voc.Educ
XII. Dept.of Community Educ.
XIII. Dept.of Youth Educ.
XIV. Dept.of Sport Educ.
XV. Dept.of Arts & Crafts Educ.
XVI. Dept.of Museum,History and Archeological Sites
XVII. Office of MOE for District Level
XVIII. Office of MOE for Sub-District Level

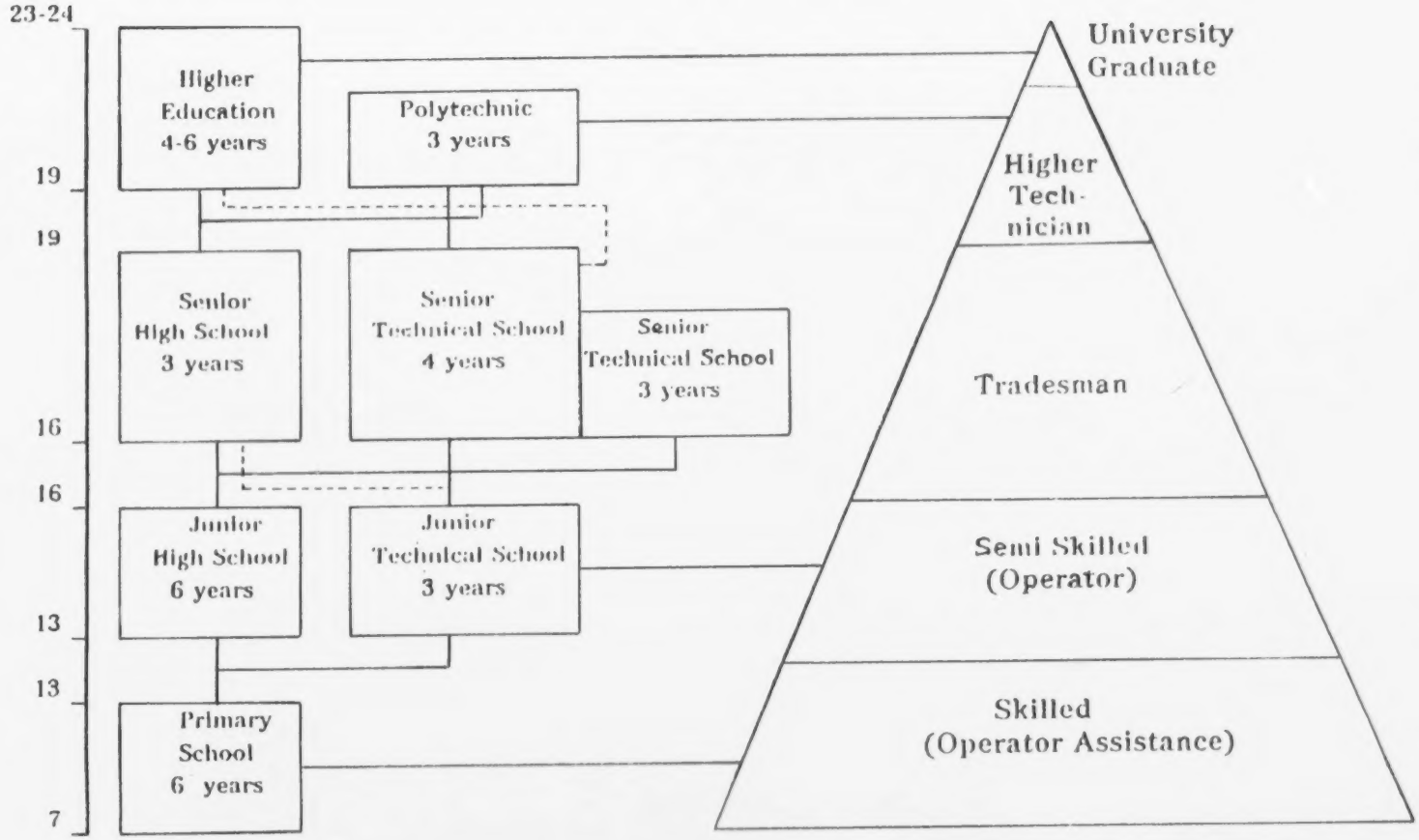
APPENDIX VI

Ladder Structure of School Types and Labour Force Pyramid



APPENDIX VII

School Ladder, Types and Level of Skills Within DTVE



School Ladder Structure

Labour Force Pyramid

APPENDIX VIII

List of Clusters and Study Programs Within Curriculum 1984 for Schools of Technical and Vocational Education

No	Group	Cluster	Study Program (Year)	Duration of Study
1	Agriculture and Forestry	1. Agronomy	1.1 Food plant and Horticulture Production	3 years
			1.2 Plantation Production	3 years
			1.3 Plantation Production	4 years
		2. Animal Husbandry	2.1 Livestock Production	3 years
		3. Fishery	3.1 Fish Culture Production	3 years
			3.2 Fish Catching Techniques	3 years
		4. Agricultural Mechanisation	4.1 Agricultural Mechanic	3 years
		5. Agricultural Product Processing	5.1 Agric. Product Processing	4 years
			5.2 Agric. Product Processing	3 years
		6. Mixed Farming	6.1 Mixed Farming	3 years
2	Engineering	1. Building	1.1 Civil Drawing	3 years
			1.2 Surveying and Mapping	3 years
			1.3 Building Construction	3 years
			1.4 Civil Construction	3 years
			1.5 Building Construction	4 years
			1.6 Civil Construction	4 years
		2 Electronics	2.1 Industrial Electronics	3 years
			2.2 Communication Electronics	3 years
			2.3 Industrial Electronics	4 years
			2.4 Communication Electronics	4 years
			2.5 Transmission Technology	4 years
			2.6 Telecommunications	4 years
		3. Electrical	3.1 Domestic Electrical Installation	3 years
			3.2 Industrial Electrical Installation	3 years
			3.3 Industrial Electrical Installation	4 years
			3.4 Electrical Power	4 years
		4. Metal Works	4.1 Metal Fabrication	3 years
			4.2 Machining	3 years
			4.3 Advanced Machining	4 years
		5 Mechanical	5.1 General Mechanics	3 years
		6. Automotive	6.1 Auto Mechanics	3 years
			6.2 Automotive	4 years
		7. Industrial Instrumentation	7.1 Process Control	4 years
			7.2 Metal and Glass instrumentation	4 years
		8. Refrigeration and Airconditioning	8.1 Refrigeration and Air Conditioning	4 years

		9. Mining Geology	9.1	Mining Geology	4 years
		10. Chemistry	10.1	Industrial Chemistry	3 years
			10.2	Industrial Chemistry	4 years
			10.3	Analytical Chemistry	4 years
		11. Textile Manufacture	11.1	Spinning	3 years
			11.2	Weaving	3 years
			11.3	Knitting	3 years
			11.4	Textile Finishing	3 years
			11.5	Spinning	4 years
			11.6	Weaving	4 years
			11.7	Knitting	4 years
			11.8	Textile Finishing	4 years
		12. Graphics	12.1	Graphics	3 years
			12.2	Graphics Production	3 years
		13. Shipbuilding	13.1	Maintenance and Repair of Ship Structure	3 years
			13.2	Maintenance and Repair of Ship Engines	3 years
		14. Airframe	14.1	Aircraft Frame Construction	3 years
			14.2	Aircraft Body Frame Construction	3 years
		15. Aircraft Production	15.1	Machining - Milling	3 years
			15.2	Machining - Lathe Work	3 years
		16. Aircraft Accessories	16.1	Aircraft Electrical installation	3 years
			16.2	Aircraft Electrical Installation	3 years
		17. Aircraft Maintenance	17.1	Aircraft Mechanics and Air Frame	3 years
			17.2	Aircraft Electrical and Instrumentation	3 years
			17.3	Aircraft Electronics	3 years
		18. Interior Design and Fittings	18.1	Interior Fitting	3 years
		19. Shipping Transportation	19.1	Navigation	4 years
			19.2	Engineering	4 years
3.	Business and Office Administration	1. Finance	1.1	Accounting	3 years
		2. Office Administration	2.2	Secretariat	3 years
		3. Business	3.1	Marketing Management	3 years
		4. Co-operatives	4.1	Cooperative Marketing Management	3 years
			4.2	Cooperative Investment and Loan Management	3 years
		5. Tourism	5.1	Travel	3 years
4.	Health and Social Work	1. Social Work	1.1	Social Medical Work	4 years
			1.2	Social Corrective Work	4 years
			1.3	Social Science and Rehabilitation Work	4 years

			1.4	Social Public Development Work	4 years
			1.5	Social Rural Public Development Work	4 years
		2. Beautician	2.1	Beautician	3 years
		3. Nutrition	2.2	Nutrition	3 years
5.	Home Economics	1. Food Technology	1.1	Food Services (Restaurant and Catering)	3 years
			1.2	Bakery (Breads and Cakes)	3 years
		2. Clothing	2.1	Boutique Clothing	3 years
		3. Tourism	3.1	Hotel Management	3 years
		4. Home Economics	4.1	Food	3 years
			4.2	Clothing	3 years
			4.3	House Keeping	3 years
6.	Culture	1. Fine Arts	1.1	Decoration	4 years
			1.2	Graphic Communication	4 years
			1.3	Craft Design	4 years
			1.4	Painting	4 years
			1.5	Sculpture	4 years
		2. Handicrafts	2.1	Plaiting/Basketry	4 years
			2.2	Ceramics	4 years
			2.3	Metal Craft	4 years
			2.4	Wood Carving	4 years
			2.5	Batik	4 years
			2.6	Leatherwork	4 years
		3. Performing Arts	3.1	Traditional Music	4 years
			3.2	Traditional Dance	4 years
			3.3	Traditional Wayang Puppet Theatre	4 years
			3.4	Arts Theatre	4 years
		4. Music	4.1	Performance	4 years

APPENDIX IX

STAGES OF TVE DEVELOPMENT

Pre-Establishment (before 1969)

- Contination of the colonial system

Establishment (1969-1989)

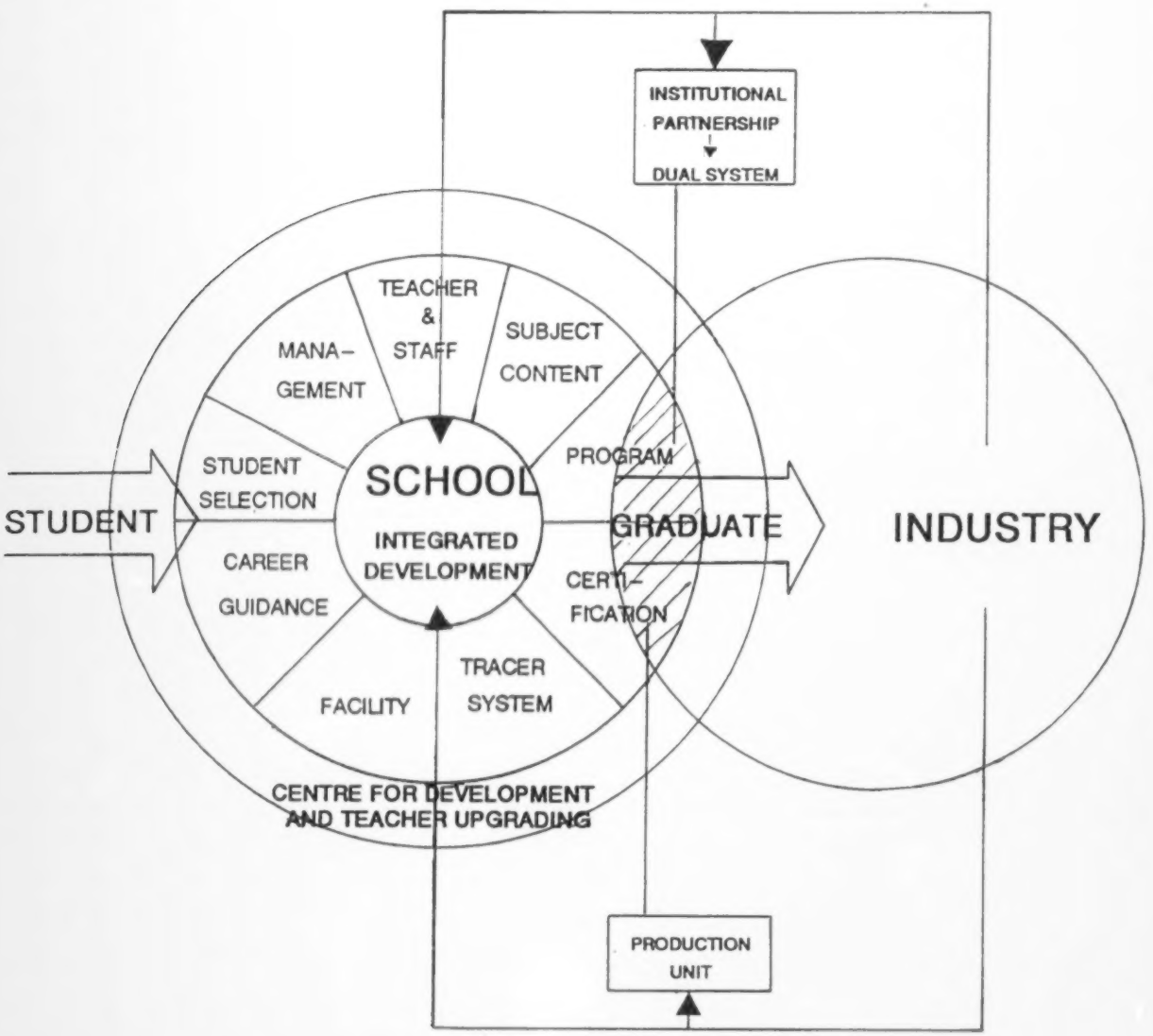
- Increase of enrolment
- Improvement of program, teachers and facilities relevant to the need of industry

Improvement (1989)

- Integrated development
- Production unit
- Institutional partnership

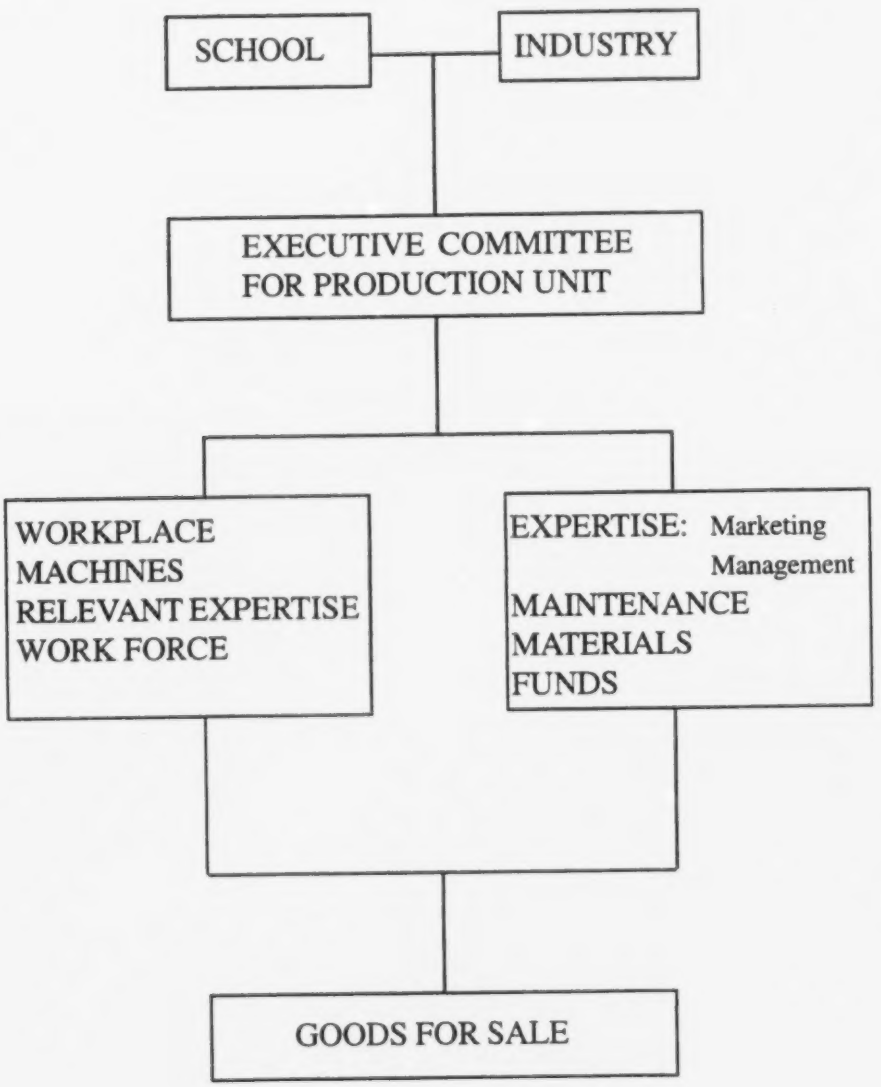
APPENDIX X

The Strategy for Quality Improvement of TVE



APPENDIX XI

Production Unit



APPENDIX XII

STEPS FOR CONDUCTING CURRICULUM VALIDATION

1. Compile profile of competency of the trade based on the curriculum
2. Make a questionnaire on the level of importance of each competency
3. Identify and select a number of relevant industries to the trade program
4. Send the questionnaire to the selected industries and ask them to rank the degree of importance of each competency
5. Collect the questionnaire
6. Tabulate the responses on the degree of importance of each competency
7. Invite industries giving responses to the questionnaire and discuss the tabulation result
8. The final result of the discussion is the profile of competency required by industry
9. Translate the profile of competence into the content of the course program
10. To strengthen the link with industries, establish an advisory committee in the meeting
11. Make the advisroy committee as the basis for further cooperation

APPENDIX XIII

MODEL OF DUAL SYSTEM

Curriculum Component:

- Normative
- Adaptive
- Basic Vocational

] School

- Professional Skill - Industry

(STM Penerbangan - model)

(Sekolah Kejuruan - model)

Curriculum Component:

- Normative
- Adaptive

] School

- Basic Vocational - School and Industry
- Professional Skill - Industry

(STM Perkapalan - model)

APPENDIX XIV

THE IMPLEMENTATION OF DUAL SYSTEM PROGRAM

1. Identification of Industry

2. Establishment of "School Industry Committee" (Majelis Sekolah)

3. Identification of the program:
   - competencies required by the curriculum
   - availability of expertise and equipment in industry

4. Development of the implementation of the program in industry:
   - system: day release
     block release
   - duration
   - rule and regulation
   - monitoring and evaluation system
   - certification

5. Development of the program for normative, adaptive and basic technical subjects during the training industry:
   - intensive program after or before the training
   - module system

6. Implementation of the training program in industry:
   - student placement
   - monitoring
   - evaluation
   - reporting